

REMARKS

This is in response to the Office Action mailed May 21, 2004, in which claims 1-43 were rejected and claim 44 was objected to. Reconsideration of the application as amended is respectfully requested.

I. SECTION 2 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 2 of the Office Action, the Examiner rejected claims 1-30 under 35 U.S.C. §103(a) as being unpatentable over Smith et al. (U.S. Patent No. 6,184,823) in view of Rogers et al. (U.S. Patent No. 6,144,335).

OVERVIEW OF THE PRESENT INVENTION AND  
A COMPARISON TO THE PRIOR ART

The mandate of 35 U.S.C. §103 is that the invention as a whole must be considered in an obviousness determination. The invention as a whole embraces the device, its properties and the problem it solves. Thus, the determination of whether a novel device is or is not obvious requires cognizance of the properties of that device and the problem which it solves, viewed in light of the teachings of the prior art. Also, a diversion of purpose between the claimed element and a corresponding element of the prior art reference is the basis for finding that the combination is not suggested. Thus, an important consideration in deciding whether an invalidating suggestion is present, is a comparison of the purpose, functions, and problems addressed by the present invention and that of the cited references.

Smith et al. utilize a geographic database that includes location and name information for roads and intersection points and other points of interest of a geographic region. The geographic database can be used by a navigation application program to identify various points of interests including roads

and intersection points in the geographic region by name, to provide location information, and route guidance. The various points of interest that are stored in the geographical database are defined by single location points or nodes, which are not in close proximity to other points of interest. For example, road sections are defined by beginning and end points that extend along the length of the road, and road intersections are defined by single points, as illustrated in FIGS. 4 and 10A-10D. The nodes are not located in close proximity to each other and are not spaced across a width of the road.

Rogers et al. relates to post-processing of Global Positioning Satellite (GPS) field data to achieve corrected position information for the data collected by the GPS receiver in the field. [column 1, lines 6-8] The post-processing of the GPS field data is necessary to provide more accurate position information for surveying and mapping purposes, something which the 10-100 meter position accuracy of GPS receivers are incapable of providing. [column 1, lines 19-34] In order to improve the inaccurate position information of the roving GPS receiver, a base GPS receiver is placed in a precisely known position, such as the National Geodetic Survey (NGS). [column 1, lines 34-38] The roving GPS receiver is used to collect data from various points, from which the roving GPS receiver's position relative to the base receiver can be calculated. [column 1, lines 38-45] The position information can be corrected to produce highly accurate position information using a differential correction scheme performed by an office-based computer. [column 1, lines 51-66]

The present invention has different properties and solves different problems than geographic databases of the prior art. The present invention is directed to a geospatial database management system that generally includes a geospatial database having data elements that are indicative of a location of various objects. The objects can be, for example, road lane boundaries,

road islands, road lane centers, and other real world objects. One of the differences between the geospatial database of the present invention and geographic databases of the prior art is the resolution of the objects that are stored therein. The objects that are stored as data elements in the geospatial database of the present invention have a resolution that is significantly higher than the resolution of objects contained in digital maps and geographic databases used by navigational systems, such as that of Smith et al., as described on page 26, lines 18-28 of the present application. Preferably, the resolution at which the objects that are stored as data elements in the geospatial database of the present invention is at a lane-level resolution. That is, the separation between the locations of adjacent stored objects is less than or equal to a width of a lane of a road. Such a resolution allows for location and boundaries of the various objects, such a road, to be defined precisely.

Additionally, the locations of the objects indicated by the data elements stored in the geospatial database of the present invention are also preferably highly accurate. In accordance with a preferred embodiment of the invention, the accuracy is approximately 1 decimeter or less.

The resolution or proximity of adjacent objects, and the accuracy of the stored location of those objects as indicated by the data elements of the geospatial database of the present invention, allow the geospatial database to be used by a subsystem 14 to provide unique assistance services to a driver of a vehicle 12 as compared to systems of the prior art. By way of example, subsystem 14 may provide an operator interface which conveys information to the operator indicative of the position of vehicle 12 within a lane of traffic, and also indicate to the driver information about objects around the vehicle. [page 6, line 26 through page 7, line 3] In one instance, subsystem 14

includes a head-up display that includes a display of LaneBoundaries that can be displayed in a manner such that they overlay the actual lane markings of a road on which the vehicle is traveling when viewed by the user. [page 13, lines 13-19] Accordingly, the geospatial database of the present invention solves the need of such a subsystem to have access to objects that are stored at a sufficiently high resolution and with a sufficiently high accuracy, something that prior art geographic databases fail to provide.

Geographic databases used by navigation systems of the prior art and digital maps lack the resolution of objects of the geospatial database of the present invention, as explained in the background of the present application. There are two main reasons that prior art geographic databases have such a low resolution. First, it is simply unnecessary because their purpose of providing a navigational tool does not require such a high resolution. Geographic databases and digital maps generally define the boundaries of roads, lakes, and other objects using multiple data points. For example, such data points may define location of an end point of the road, a location where the road changes direction, and a location of another end of the road. However, such data points are relatively significantly spread out because the details of minor twists and turns in the road are insignificant for the purpose of general navigation. For instance, it is unnecessary to define an intersection of roads with numerous location data points that define the boundaries of the roads at the intersection. Instead, a single point at the intersection is all that is required to provide the desired navigational function, as illustrated in Smith et al. in FIGS. 4 and 10A-10D. Therefore, such systems of the prior art lack any need for the storage of objects at a high resolution as provided by the present invention. More particularly, such systems of the

prior art lack any need for the storage of objects that define various lane boundaries within a width of a road.

Second, prior art navigation systems have a desire to minimize the size of the database in order to preserve memory and improve performance. This is generally explained in Smith et al. at column 12, lines 7-22. Accordingly, such systems avoid the storage of data that would be excessive for their navigational purpose. Since the storage of objects at a lane-level resolution would fail to provide any significant advantage to a user for the purpose of navigation, the storage of objects at such a resolution would be excessive and, therefore, be undesired due to the need to preserve critical data storage space.

CLAIMS 1-30 ARE NON-OBVIOUS IN VIEW  
OF THE CITED REFERENCES

Applicant respectfully disagrees with the Examiner's assessment of the cited references and believes that the Examiner has failed to establish a *prima facie* case of obviousness against the claims. To establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Additionally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination must be found in the prior art, not in Applicant's disclosure.

In rejecting the claims, the Examiner found Smith et al. to teach several elements of independent claims 1, 23 and 27 including the claimed geospatial database. The Examiner did not find Smith et al. to teach the accuracy of the location coordinates being at approximately one decimeter or less. The Examiner then found Rogers et al. to teach such an accuracy and

concluded that it would have been obvious "to have an accuracy in location coordinates to approximately one decimeter or less in the invention of Smith as achieved through well-known methods in the art shown by Rogers." However, the Examiner failed to provide any motivation for combining the references or making the modification to Smith et al.

The Federal Circuit has stated, "virtually all [inventions] are combinations of old elements." Environmental Designs, Ltd. v. Union Oil Co., 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983). The Federal Circuit has also found that rejecting patents solely by finding prior art corollaries for the claimed elements would permit an Examiner to use a claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention, which would be "an illogical and inappropriate process by which to determine patentability." Sensonics, Inc. v. Aerosonic Corp., 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996). Accordingly, even seemingly simple changes require a finding of a suggestion in the prior art to make the modification to avoid the improper use of hindsight. In re Gordon, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984).

Applicant submits that no motivation to combine the cited references exists outside of Applicant's disclosure. In Section 10a of the Office Action, the Examiner argued that navigation systems "depend on the accuracy of their locations in order to function properly and effectively", but failed to provide any support for the assertion. Applicant respectfully disagrees with the assertion because navigational systems, such as that described by Smith et al., do not require decimeter or less accuracy to perform in an excellent manner. For instance, one utilizing the navigational system of Smith et al. has no need to know when he or she is within one decimeter of an intersection. Rather, accuracy on the order of twenty meters or

more is sufficient to provide excellent navigational performance. Therefore, even if one assumes that the navigational system of Smith et al. could be modified to utilize the correction scheme of Rogers et al., there is still no reason to modify Smith et al. to have such accuracy. Furthermore, nowhere in Smith et al. is there any suggestion of an accuracy problem or a need for more accurate location information.

Because the unsupported assertion presented by the Examiner is insufficient to form a basis of a suggestion or motivation to modify the navigational system of Smith et al. to have decimeter or less accuracy, Applicant submits that the Examiner is forced to rely on the teachings of Applicant's disclosure to discern the "obviousness" of the claimed invention. Such use of hindsight is improper. *In re Lee*, 61 USPQ2d 1430 (Fed. Cir. 2002) ("It is improper, in determining whether a person of ordinary skill in the art would have been led to this combination of references, simply to '[use] that which the inventor taught against its teacher.'") (quoting *W.L. Gore v. Garlock, Inc.*, 220 USPQ 303, 312-13 (Fed. Cir. 1983)). Therefore, Applicant believes that the Examiner has failed to establish a *prima facie* case of obviousness against the rejected claims since there is no suggestion or motivation for the combination of Smith et al. with Rogers et al. Accordingly, Applicant submits that independent claims 1, 23 and 27 are allowable and requests that the rejections be withdrawn. Additionally, Applicant submits that claims 2-26, 24-27 and 28-30 are allowable as respectfully depending from allowable independent claims 1, 23 and 27, and requests that the rejections be withdrawn.

Even if a suggestion or motivation could be found to combine Smith et al. and Rogers et al. outside of Applicant's disclosure, the combination would still not result in the formation of the present invention. In general, even if the accuracy of the location information contained in the geographic

database of Smith et al. was improved using the correction scheme disclosed in Rogers et al., the geographic database of Smith et al. would still not form the geospatial database of the present invention as described in claims 1, 23 and 28. In particular, the cited references fail to teach or suggest the lane-level resolution of the objects that are stored in the geospatial database as data elements. As described above, such a resolution allows the system of the present invention to assist users in different ways than can be provided by prior art systems.

In Section 10b of the Office Action, the Examiner found that the road segment data of Smith et al. including information on direction of travel, was at a lane-level. However, the Examiner failed to provide any explanation of where such data is disclosed as having a lane-level accuracy. In fact, such a lane-level accuracy is not used by navigational systems, such as that of Smith et al., since they form the road segments by points that are spaced much further than a width of a lane. Moreover, such points are used to define the entire road rather than lanes within a road. Additionally, nowhere in Smith et al. is there any disclosure that the direction of travel is based upon a lane-level resolution of the road segment data. Applicant submits that the Examiner's unsupported conclusion that the road segment data and direction of travel information is at a lane-level resolution cannot support a *prima facie* case of obviousness against the claim.

Accordingly, Applicant submits that the combination of Smith et al. and Rogers et al. fails to disclose or suggest all of the features of claims 1, 23 and 28. Therefore, Applicant believes that claims 1, 23 and 28 are allowable and requests that the rejections be withdrawn. Additionally, Applicant requests that all claims depending from claims 1, 23 and 28 are allowable as being dependent from allowable base claims.

The cited references also fail to disclose a "driver



assist subsystem configured to assist a driver of the host vehicle based on the data elements stored in the geospatial database", from which the database manager receives database queries as described in claim 1. Applicant disagrees with the Examiner's finding that the "user" of Smith et al. is a "driver assist subsystem" under the "broadest reasonable interpretation of that limitation in the claim language", since "the user necessarily must input the queries into an interface, shown in FIG. 1." Applicant submits that the Examiner's interpretation of the claim -- that the subsystem would be the user who assists him or herself based on the data elements stored in the geospatial database -- is unreasonable in light of the specification and the plain meaning of the claim language.

A reasonable interpretation of the claim requires consideration of the specification on which it is based, not in a vacuum. In re Dean, 291 F.2d 947, 130 USPQ 107, 110 (CCPA 1961). The plain meaning of the claim clearly indicates that Applicant is attempting to describe something other than the user that provides assistance to the user based on the data elements stored in the geospatial database. Such an interpretation is supported by the specification, unlike the Examiner's interpretation of the claim language. For instance, the specification generally describes the subsystem on page 6, lines 26-27 as being configured to "assist the driver of vehicle 12 in a variety of different ways." Embodiments of the subsystem described in the specification include a "head-up display . . . [for] creating a virtual representation of the views out the windshield that allow the operator to safely maneuver the vehicle in impaired or low visibility conditions." [page 7, lines 13-18] and a "virtual mirror or other vision assist system that creates a virtual representation of views looking in different directions from vehicle 12." [page 7, lines 18-21] Additional embodiments of the subsystem include a "virtual rumble strip that provides a haptic

feedback through the steering wheel, brake pedals, the seat, etc. to give the operator a sense of the vehicle position within a current lane" [page 7, lines 22-26] and other driver assisting components.

Applicant submits that the rejection is improper because there is no support in the specification for the Examiner's interpretation of the claim language. Accordingly, Applicant submits that Smith et al. fail to disclose or suggest the claimed driver assist subsystem of claim 1.

Likewise, Applicant submits that claim 27 is allowable since it also includes a driver assist subsystem that provides a query to a database accessing system that is configured to access the objects in the geospatial database in response thereto. Applicant submits that the cited references fail to disclose the claimed driver assist subsystem, when read in light of the specification. Therefore, Applicant submits that claim 27 is allowable and requests that the rejection be withdrawn.

Applicant also disagrees with the rejections of claims 15-22. The Examiner rejected the claims based upon a finding that Smith et al. teaches "a variety of different attributes that may be included in the database (column 8, lines 1-25), that are not limited to only those explicitly defined, but also to other attributes common in a geospatial database." However, the Examiner failed to cite any teachings in Smith et al. or Rogers et al. of the attributes described in claims 15-22. Instead, in Section 10d of the Office Action, the Examiner cites Breed et al. (U.S. Patent No. 6,526,352 B1) and Chervený et al. (U.S. Patent No. 6,047,234 A) as providing evidence of the attributes described in claims 15-22. However, Applicant submits that the rejections of claims 15-22 are not based upon those references, but only on Smith et al. and Rogers et al. Accordingly, Applicant maintains that the rejections are improper.

Moreover, even if Breed et al. and Chervený et al.

disclose the attributes and features described in claims 15-22, there must still be some evidence of a motivation or suggestion outside of Applicant's disclosure to modify Smith et al. to include those attributes. Applicant submits that, should the Examiner reject claims 15-22 of the present application based on those references, Applicant submits that evidence of a motivation or suggestion to modify Smith et al. to include the attributes and features of claims 15-22, outside of Applicant's disclosure, must be provided. Currently, no such evidence has been presented by the Examiner.

Accordingly, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness against claims 15-22, and requests that the rejections be withdrawn.

## II. SECTION 3 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 3 of the Office Action, the Examiner rejected claims 31-33 and 40 under 35 U.S.C. §103(a) as being unpatentable over the combination of Smith et al. and Rogers et al. in view of Schofield et al. (U.S. Patent No. 5,949,331).

Applicant submits that claim 31 is allowable as being dependent upon allowable base claim 1, and requests that the rejection be withdrawn.

Claim 32 describes the displayed boundaries of the image generated on the head-up display as substantially overlaying the "actual lane boundaries of the travel paths when viewed by the driver of the host vehicle." Such a display is neither taught nor suggested by the cited reference. Instead, Schofield et al. merely discusses providing "short horizontal lines [that] are superimposed on the displayed image at regular rearward intervals in horizontal positions which correspond to the boundaries of the lane in which the vehicle is traveling." [column 10, lines 59-63] The horizontal lines are not positioned to overlay the actual (i.e., real world) lane boundaries as

described in claim 32. Instead, the horizontal lines are positioned in an attempt to overlay the lines in the image provided by the display. Accordingly, Applicant submits that Schofield et al. fails to disclose the limitation of claim 32, when claim 32 is reasonably construed in accordance with its plain meaning and in light of the specification.

Additionally, Applicant disagrees with the Examiner's finding of a motivation to combine the teachings of Schofield et al. with that of Smith et al. "in order to increase the driver's awareness of the objects around the vehicle." In particular, Smith et al. does not include any type of system that would allow for the detection of objects in the vicinity of a vehicle and, moreover, provides no suggestion or motivation for such a system. Similarly, Schofield et al. fails to provide any suggestion or motivation for combining its teachings with that of a conventional navigational system, such as that taught by Smith et al. Therefore, Applicant submits that the Examiner has failed to establish a *prima facie* case of obviousness against claim 32, and requests that the rejection be withdrawn.

With regard to claim 33, the Examiner found the cameras 14 and 16 of Schofield et al. to teach the radar subsystem of claim 33. Applicant respectfully disagrees with the Examiner's assessment of the cited reference. In particular, nowhere in the cited reference is there any teaching of the cameras 14 and 16 "detect[ing] objects in a vicinity of the host vehicle." Instead, the cameras 14 and 16 of Schofield et al. merely capture images. Although it may be possible for someone to use the captured images to detect such objects, the cameras 14 and 16 do not provide such a detection function. Additionally, the cited cameras 14 and 16 fail to "pass a location of the detected objects to the head-up display" as described in claim 33. Accordingly, Applicant submits that claim 33 is allowable since it is neither taught nor suggested by the cited references, and

requests that the rejection be withdrawn.

With regard to claim 40, the Examiner has failed to identify where Schofield et al. discloses a radar filtering subsystem "that blocks the passage of the location of selected objects, detected by the radar subsystem, to the head-up display." Applicant submits that such a radar filtering subsystem is neither disclosed nor suggested by Schofield et al. Accordingly, Applicant submits that claim 40 is allowable, and requests that the rejection be withdrawn.

### III. SECTION 4 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 4 of the Office Action, the Examiner rejected claims 34, 36, 37, 41 and 42 under 35 U.S.C. §103(a) as being unpatentable over the combination of Smith et al. and Rogers et al. in view of Wilson-Jones et al. (U.S. Patent No. 5,765,116). Applicant submits that claims 34, 36, 37, 41 and 42 are allowable as being dependent from independent claim 1, which is believed to be allowable for the reasons set forth above. Accordingly, Applicant requests that the rejections be withdrawn.

### IV. SECTION 5 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 5 of the Office Action, the Examiner rejected claim 35 under 35 U.S.C. §103(a) as being unpatentable over the combination of Smith et al., Rogers et al., and Wilson-Jones et al., and further in view of Breed et al. (U.S. Patent No. 6,370,475). Applicant submits that claim 35 is allowable as being dependent from claim 1, which is believed to be allowable for the reasons set forth above. Accordingly, Applicant requests that the rejection be withdrawn.

V. SECTION 6 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 6 of the Office Action, the Examiner rejected claims 38 and 39 under 35 U.S.C. §103(a) as being unpatentable over the combination of Smith et al. and Rogers et al. in view of Breed et al. Applicant submits that claims 38 and 39 are allowable as being dependent from claim 1, which is believed to be allowable for the reasons set forth above. Accordingly, Applicant requests that the rejections be withdrawn.

VI. SECTION 7 CLAIM REJECTIONS - 35 U.S.C. §103

In Section 7 of the Office Action, the Examiner rejected claim 43 Under 35 U.S.C. §103(a) as being unpatentable over the combination of Smith et al. and Rogers et al., in view of Dobler et al. (U.S. Patent No. 6,038,496). In general, The Examiner found Dobler et al. to teach a radar system that is used with a vehicle to detect objects in the vehicle's vicinity and issue a warning to the driver at column 1, lines 5-16. Applicant respectfully disagrees with the Examiner's assessment of Dobler et al.

In particular, the system of Dobler et al. fails to "pass a location of the detected objects to the driver assist subsystem" as described in claim 43. Additionally, the system of Dobler et al. does not include "a radar filtering subsystem that blocks the passage of the location of selected objects, detected by the radar subsystem, should the driver assist subsystem" as described in claim 44. Accordingly, Applicant believes that claims 43 and 44 are allowable even in view of the cited references, and requests that the rejections be withdrawn.

VII. ALLOWED SUBJECT MATTER

In Section 8 of the Office Action, the Examiner objected to claim 44 as being dependent upon a rejected base

claim, but indicated that it would be allowable if rewritten in independent form. With this Amendment, Applicant has amended claim 44 to place it in independent form such that it includes substantially all the limitations of claims 1 and 43, from which it previously depended. Accordingly, Applicant submits that claim 44 is in condition for allowance, and requests that the objection be withdrawn.

#### VIII. CONCLUSION

In view of the above comments and remarks, it is believed that the present application is in condition for allowance. Consideration and favorable action is respectfully requested.

The Director is authorized to charge any fee deficiency required by this paper or credit any overpayment to Deposit Account No. 23-1123.

Respectfully submitted,

WESTMAN, CHAMPLIN & KELLY, P.A.

By: 

Brian D. Raul, Reg. No. 41,885  
Suite 1600 - International Centre  
900 Second Avenue South  
Minneapolis, Minnesota 55402-3319  
Phone: (612) 334-3222 Fax: (612) 334-3312

BDK/djb